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Summary of Mitigation Measures

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Affected Environment	Measures to Mitigate Adverse Effects
Land Use and Land Use Planning	FHWA and WisDOT would compensate property owners for land acquired from residences, businesses, utilities, and institutions (see Sections 3.4.3, 3.5.3, 3.6.4, and 3.8.3).
Transportation Service	See Construction Impacts for measures to manage congestion during construction that would be a result of lane closures on the study-area freeway system and adjacent local streets. WisDOT and FHWA are coordinating railroad bridge construction with Union Pacific Railroad to minimize interruptions to rail service while replacing the railroad bridges over I-94, US 45, and potentially North Avenue and I-894/US 45 over the Union Pacific Railroad. WisDOT and FHWA will coordinate with Canadian Pacific Railway to minimize interruptions to rail service while replacing the US 45 bridge over the Canadian Pacific rail line.
Utilities	WisDOT will compensate American Transmission Company and We Energies for relocating their electrical transmission lines that are not in WisDOT right-of-way. American Transmission Company will compensate DNR and the Milwaukee County Zoo for building electrical transmission towers on DNR's Hank Aaron State Trail corridor and the zoo, if required. WisDOT and FHWA will continue coordinating with utilities, municipalities, and the county to avoid or minimize interruptions in service during construction.
Residential Development	Federal property acquisition law provides for payment of just compensation for businesses and residences displaced for a federally funded transportation project (Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended). Acquisition price, replacement dwelling costs, moving expenses, increased rental or mortgage payments, closing costs, and other relocation costs are covered for residential displacements. Acquisition and relocation costs for business displacements are also covered under federal law. State law (Wisconsin's Eminent Domain Law under Section 32.05, Wisconsin Statutes) would cover increased rental or mortgage payments and closing costs for businesses. Under state law, no person or business would be displaced unless a comparable replacement dwelling, business location, or other compensation (when a suitable replacement business location is not available) would be provided. Compensation is available to all displaced persons without discrimination. Prior to appraisals and property acquisition, an authorized relocation agent interviews each owner and renter to be relocated to determine their needs, desires, and unique situations associated with relocating. The agent explains the relocation benefits and services each owner may be eligible to receive. Property acquisition not involving residential, business, or other building relocations are also compensated in accordance with state and federal laws. In consultation with the owners, the value of affected land would be appraised, and the owner compensated at fair market value. WisDOT would handle real estate acquisition. Prior to appraisals and property acquisition, an authorized relocation agent interviews each owner and renter to be relocated to determine their needs, desires, and unique situations associated with relocating. The agent explains the relocation benefits and services each owner may be eligible to receive. Compensation is available without discrimination to all displaced persons. Before initiation of property acquisition, WisDOT provides information explaining the acquisition process and the state's Eminent Domain Law under Section 32.05, Wisconsin Statutes. A professional appraiser inspects the property to be acquired. Property owners are invited to accompany the appraiser to ensure that full information about the property is taken into consideration. Property owners may also obtain an independent appraisal. Based on the appraisal, the value of the property is determined and that amount offered to the owner. In the event agreement on fair market value cannot be reached, the owner would be advised of the appropriate appeal procedure.

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	Any septic tanks, drain fields, or wells on acquired properties would be abandoned in accordance with state regulations and local zoning standards. WisDOT will survey all buildings that will be demolished to determine whether asbestos or lead paint is present. All appropriate and applicable engineering and regulatory controls will be followed during the handling and disposal of asbestos-containing material and lead-based paint. Contractors must comply with the requirements of the U.S. EPA regulations, National Emission Standards for Asbestos, the Occupational, Safety, and Health Administration regulations on asbestos removal, all applicable regulations, and local government regulations. The most recent editions of all applicable standards, codes, or regulations shall be in effect. In addition, any person performing asbestos abatement must comply with all training certification requirements, rules, regulations, and laws of the State of Wisconsin regarding asbestos removal. Before a contractor demolishes a building that may contain or is known to contain asbestos, the contractor must properly notify the DNR and Wisconsin Department of Health and Family Services at least 10 working days before starting the work, using DNR Form 4500-113 “Notification of Demolition and/or Renovation and Application for Permit Exemption.” Demographic data for the areas in which the residential displacements would occur indicate that no age or income level characteristics exist that would require special relocation consideration or services. If unusual circumstances were to arise during real estate activities, WisDOT real estate personnel would be available to provide appropriate relocation services.
Commercial and Industrial Development	Commercial and industrial acquisitions and relocations would be in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. In addition to providing just compensation for property acquired, additional benefits are available to eligible displaced businesses, including relocation advisory services, reimbursement of moving expenses, and down-payment assistance. Under state law, no person would be displaced unless a comparable business location or other compensation (when a suitable business location replacement is not practical) is provided. Compensation is available to all displaced businesses without discrimination. Before initiating property acquisition activities, property owners would be contacted and given a detailed explanation of the acquisition process and Wisconsin’s Eminent Domain Law under Section 32.05, Wisconsin Statutes. Any property acquired would be inspected by one or more professional appraisers. The property owner would be invited to accompany the appraiser during the inspection to ensure that the appraiser is informed of every aspect of the property. Property owners will be given the opportunity to obtain an appraisal by a qualified appraiser that will be considered by WisDOT in establishing just compensation. Based on the appraisal, the value of the property would be determined and that amount offered to the owner. Before a contractor demolishes a building that may contain or is known to contain asbestos, the contractor must notify DNR and Wisconsin Department of Health and Family Services at least 10 working days before starting the work, using DNR Form 4500-113: “Notification of Demolition and/or Renovation and Application for Permit Exemption.”
Institutional and Public Services	WisDOT and FHWA will fairly compensate schools, churches, Milwaukee County, and State Fair Park for buildings or land acquired as part of the project. WisDOT and FHWA will work with State Fair Park Board and Pettit Center Board to develop options for replacing lost parking space, including construction of parking structures. Milwaukee County may move its Focus Program out of the building that would be relocated under Modernization Alternatives N1 and N3, regardless of whether WisDOT acquires the building for US 45 reconstruction. WisDOT and FHWA will develop appropriate mitigation in conjunction with Milwaukee County.

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	To minimize the amount of land required from institutional properties along the freeway corridor, service interchanges were designed with ramps that are located as close to the freeway mainline as possible.
Surface Water and Fishery	WisDOT would implement stormwater management techniques for the Modernization Alternatives. The Modernization Alternatives will increase impervious area and therefore increase the amount of stormwater runoff from the study-area freeway system. However, these alternatives will also provide the opportunity to implement best management practices (BMPs) to treat the runoff and bring the study-area freeway system in compliance with Wisconsin's stormwater management regulations that limit the amount of pollution in runoff. Stormwater treatment measures will be evaluated during the project's design phase. BMPs can be utilized for stormwater management. BMP options include the following: • Retention Basins (Wet Detention Basins)—Retention basins have a permanent pool of water year-round. The permanent pool allows pollutant particles in stormwater runoff to settle out over an extended period of time. Nutrient uptake also occurs through increased biological activity. • Dry Detention Basins—A dry detention basin is typically designed to store runoff and discharge it slowly to reduce the peak discharge downstream. As normally designed, these basins typically have little effect on the volume of stormwater released to the receiving water. The peak flow reduction is often accomplished through use of a multistage outlet structure that allows increased discharge as water levels in the basin increase. • Infiltration Devices—Infiltration can be achieved through use of trenches or grass swales. Infiltration devices are used to slow down water flow so that more water is absorbed into the ground and more pollutants are removed from runoff. • Grass Ditches—This BMP generally helps reduce suspended solids to meet the regulatory goal of TRANS 401, which outlines stormwater management and erosion control procedures for WisDOT projects. • Trapezoidal Swale through Infield—This BMP combines grass ditch treatment with peak flow reduction and is considered the same level of suspended solid control as grass ditches. • Vegetated Rock Filters—This BMP may be used at outfalls to waterways or anywhere concentrated runoff leaves the right of way. It is similar in concept to a level spreader which attempts to reintroduce sheet flow and also provides a small amount of peak flow and volume reduction. • Swale Blocks/Ditch Checks—These are small earthen berms constructed in the bottom of a ditch at regular intervals to detain runoff from frequent storms. This BMP provides peak flow reduction and may provide infiltration benefits depending on soil conditions. • In-line Storage—This method is not as desirable from a water quality standpoint but would manage water quantity. Storm sewer pipes would be designed larger than normal to provide storage in the sewer during rain events before the water is gradually released after the rain event ends. To comply with State Statute 87.30 and NR 216[1] and to address concerns raised by MMSD and the City of West Allis, WisDOT and FHWA are also investigating retention/detention basins to manage stormwater from the proposed improvements. The retention/detention ponds would also improve water quality by allowing solid pollutants (sand, grit, etc.) to settle out of the water before it flows into storm sewers or streams. If these retention/detention ponds are built, WisDOT will provide landscaping around the pond. Potential locations for retention/detention basins include:

[1] NR 216 says that WisDOT bridge "construction may not cause any obstruction to flood flows."

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	• West Leg—Along the Underwood Creek Parkway south of I-94. Stormwater runoff from the south and west legs would be stored at this location. The Oak Leaf Trail is routed along a little-used roadway that currently occupies the potential pond location. WisDOT would remove the roadway and relocate the Oak Leaf Trail to a location suitable to the Milwaukee County Parks Department if a pond were built at this location. • East Leg—In the northwest quadrant of the I-94/84th Street interchange. A retention/detention basin in this location may require relocating the Honey Creek stream bed further east of its current location. The basin would provide storage for stormwater runoff from the east leg of the study-area freeway system. There is opposition to a pond at this location from adjacent residents. DNR has encouraged WisDOT to consider Honey Creek channel improvements downstream of I-94 in lieu of a retention/detention basin. The channel improvements could include removing the concrete lining and providing a wider channel. WisDOT will work with DNR, MMSD, and local governments to investigate this option. • North Leg—In the northeast quadrant of the US 45/Watertown Plank Road interchange. The basin would collect stormwater runoff from US 45, between the Zoo Interchange and Swan Boulevard. North of Underwood Creek to an area approximately 900 feet south of Burleigh Street, stormwater runoff would continue to flow through the freeway storm sewer system, into Wauwatosa storm sewers, and discharge to Underwood Creek. • Core—reconfiguration of the core of the Zoo Interchange may make space available for one or more small ponds. The core drains into Honey Creek, so ponds in the core would reduce the need for a pond at 84th Street. After a preferred alternative for the Zoo interchange is made, WisDOT will assess the different water quality and water quantity management options during the design phase. The Section 404 permit process, which will occur after the stormwater management plan is developed, will provide an opportunity for public input on the issue of a retention/detention pond at 84th Street because a pond at this location would require re-aligning Honey Creek, which would be subject to the Section 404 permit process. No fishery mitigation measures have been identified.
Floodplains and Hydraulics	All structures would have adequate capacity for 100-year flood flow without public or emergency vehicle interruption from damage to the roadway or structures and would not increase headwater elevations by more than 0.01 foot. None of the floodplain crossings would cause a substantial potential for interruption or termination of a transportation facility needed for emergency vehicles or the community's only evacuation route. Crossings would be consistent with local floodplain management goals and objectives. Additionally, floodplain crossings will be designed to not make the existing flood profile worse for adjacent landowners.
Groundwater and Water Supply	WisDOT and FHWA will ensure that access to and maintenance of the county zoo's well head is not adversely affected.
Wetlands	In accordance with state and federal agency policies and regulations for wetland preservation, including the Section 404(b)(1) Guidelines for Specifications of Disposal Sites for Dredged or Fill Material (40 CFR part 320) the following discussion summarizes wetland mitigation strategies for the Zoo Interchange study. **Wetland Compensation.** Compensation for unavoidable wetland loss will be carried out in accordance with WisDOT's Wetland Mitigation Banking Technical Guideline developed as part of the WisDOT-DNR Cooperative Agreement on Compensatory Wetland Mitigation. A wetland mitigation plan will be developed during the project's design phase, in consultation with state and federal agencies.

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	WisDOT developed the guideline in 1993 and updated it in 1997 and 2002 in cooperation with DNR, the Corps, U.S. EPA, U.S. Fish and Wildlife Service, and FHWA. Through the guideline, these agencies established a statewide policy regarding the sequence of activities required for WisDOT to compensate for wetland losses. Specifically, the guideline states “preference should be given for compensatory mitigation accomplished in the vicinity of the impacted area (onsite). Where such opportunities are not present or practical, in-watershed (near-site) opportunities should be explored.” For those cases in which onsite or near-site opportunities for wetland mitigation are not available, WisDOT can debit the wetland loss at the closest established wetland mitigation bank. Since the time at which the guideline was developed, onsite has been typically interpreted as being within 0.25 mile of the wetland impact, while near-site has been interpreted as within 2.5 miles of the wetland impact area. Therefore, a mitigation site search for a linear corridor, such as the I-94, I-894, and USH 45 corridors, would encompass a 0.5-mile corridor centered on the highway and expand to a 5-mile corridor if onsite opportunities were not available. The guideline provides ratios for wetland replacement versus wetland loss depending on where the mitigation is to be provided. The replacement ratios increase with the mitigation site’s distance from the impacted wetland. WisDOT has an established statewide wetland mitigation bank located in Walworth County that has remaining acreage available for credit. Debiting wetland acreage credits from this bank to mitigate for the wetland losses from the Zoo Interchange project would be in accordance with the terms of the guideline.
Threatened and Endangered Species	Bridges and culverts will be inspected prior to construction to determine if any migratory birds are present. WisDOT will coordinate with DNR to develop appropriate measures to mitigate adverse effects to the Butler’s garter snake. Potential measures include designing the recommended alternative to minimize impacts to the Tier 3 habitat, fencing to keep the snakes out of the construction area, and trapping or hand-collecting snakes that are inside the fenced area prior to construction. The fencing will be installed prior to March 15 each year to isolate the area that will be disturbed. If the fencing is in place prior to March 15, snakes would not need to be removed from inside the fenced area. Any area with potential habitat for the Blanding’s turtle will be fenced with turtle fencing. The fencing will be in place by March 15. WisDOT will remove swallow nests from the underside of bridges between August 20 and May 15 prior to construction. The nests are unoccupied during this period. After swallow nests are removed WisDOT will place nets under the bridge to keep swallows from re-establishing nests on bridges that are about to be removed.
Noise	Based upon the requirements of 23 CFR 772 and within the framework of TRANS 405, various methods were reviewed to mitigate the noise impact of the proposed improvements. Among those considered were restricting truck traffic to specific times of the day, prohibiting trucks, altering horizontal and vertical alignments, property acquisition for construction of noise barriers or berms, property acquisition to create buffer zones to prevent development that could be adversely impacted, insulating public use or nonprofit institutional buildings, berms, and sound barriers. Restricting or prohibiting trucks is counter to the project purpose and need. Design criteria and recommended termini for the proposed project preclude substantial horizontal and vertical alignment shifts that would produce noticeable changes in the projected acoustical environment. Due to right-of-way limitation the construction of noise berms is neither feasible nor reasonable. Therefore, only the construction of noise barriers was reviewed. Abatement is recommended only when it is feasible and reasonable to construct a noise barrier.

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	TRANS 405, Siting Noise Barriers, has established criteria for determining feasibility and reasonableness and is summarized as follows: • The barrier must provide a minimum 8-dB reduction. • The total cost of the barrier may not exceed $30,000 per abutting residence. • There must be a formal resolution from the local government supporting the noise barrier. • The local government must provide documentation of land use controls, which would reasonably eliminate the need for noise barriers adjacent to future developments that abut freeways or expressways. The 66 dBA Leq(1h) setback distance along undeveloped areas abutting the study-area freeway system would be 385 feet. The setback distance indicates that noise levels within these distances, measured perpendicular to the centerline of the nearest lane in either direction, is 66 dBA or greater. This setback distance was developed to assist local planning authorities in developing land use control over the remaining undeveloped lands along the project in order to prevent further development of incompatible land use. Noise mitigation for future developments constructed within the setback distance will be the responsibility of the local communities or the developer. Based on the study, and as shown in Table 3-19, WisDOT intends to replace the existing noise barriers and install the additional feasible and reasonable noise barriers. During the next phases of the project, as locations of retaining walls are more accurately defined relative to the surrounding areas, the location of feasible and reasonable noise mitigation will be reassessed. If final design results in substantial changes in roadway design from the conditions modeled for the DEIS or FEIS, noise abatement measures will be reviewed. During the public comment period on this Draft EIS, comments on noise concerns will be solicited at the public hearing from local residents, and officials from the jurisdictions affected by the project. These comments will be used to prepare the Final EIS. A final decision on installing abatement measures will be made upon completion of the project design and the public involvement process.
Air Quality	See Construction Impacts.
Hazardous Materials	During the project's real estate acquisition phase WisDOT will survey all buildings that need to be demolished to determine whether asbestos is present. WisDOT will survey all bridges that will be removed for asbestos and include the results of the survey in the final environmental document. All appropriate and applicable engineering and regulatory controls will be followed during the handling and disposal of asbestos-containing material.
Historic Sites	WisDOT and FHWA are currently working with State Historic Preservation Office to assess the potential impacts to historic resources. Results of the ongoing coordination and resolution of requirements under Section 106 of the National Historic Preservation Act will be presented in this study's final environmental document. The final environmental document will not be approved until the Section 106 process has been completed.
Recreational Resources / Public Use Land	***Underwood Creek Parkway/Oak Leaf Trail/Wil-O-Way Underwood Special Recreation Center*** Prior to reconstructing US 45, WisDOT will compensate Milwaukee County for the acquisition from the Underwood Creek Parkway/Oak Leaf Trail and Wil-O-Way Underwood Special Recreation Center. WisDOT will coordinate the Milwaukee County Parks Department to develop appropriate mitigation along Underwood Creek Parkway. Mitigation may include improving the vegetation surrounding the bridge or working with the Parks Department to add elements to the US 45 bridge over the parkway that would help the bridge blend in better with the surrounding natural environment.

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	Wil-O-Way does not meet TRANS 405 criteria for a noise wall. WisDOT will construct visual screening between US 45 and Wil-O-Way that may include a berm, a screening wall, or both. WisDOT will continue to work with Milwaukee County Parks Department and the Office for Persons with Disabilities during the design phase to develop appropriate mitigation. ***Milwaukee County Zoo*** Prior to reconstructing the Zoo Interchange, WisDOT and FHWA will compensate Milwaukee County for property acquired from the zoo. WisDOT and FHWA will replace the buildings acquired (Zoofari Conference Center, maintenance facility) and overflow parking lot. The maintenance facility may be relocated to an unused area in the northwest corner of the zoo property. Zoo officials identified this as a feasible location. The Zoofari Conference Center would also be replaced on zoo grounds. If any of the vegetative buffer on the southwest side of the zoo is removed, mitigation will include screening walls or new landscaping. ***Chippewa Park*** Prior to reconstructing US 45, WisDOT will compensate Milwaukee County for the acquisition from Chippewa Park. WisDOT will continue to work with Milwaukee County during the design phase to develop appropriate mitigation. If any vegetative buffer is removed from Chippewa Park mitigation will include screening walls and/or new landscaping. ***Honey Creek Parkway*** If a pond is built, WisDOT will continue to work with the Milwaukee County Parks Department during the design phase to develop appropriate mitigation for the impact. Initial discussion has focused on realigning Honey Creek and returning it to a more natural stream bed. The concrete-lined channel installed in the 1960s would be removed. Landscaping and fencing would be installed around the pond. ***Hank Aaron State Trail*** WisDOT will work with DNR to develop a suitable connection between the built portion of the HAST and the Oak Leaf Trail until fullHAST construction is complete following Zoo Interchange construction work. ***West Allis Cross Town Connector*** If and when the West Allis Cross Town connector route is finalized, WisDOT will work with the City of West Allis to ensure I-894/US 45 and the Connector are compatible. If the trail is built prior to reconstruction of the bridge carrying I-894/US 45 over the Connector, the trail will be closed during the bridge's construction and WisDOT will work with the City of West Allis to devise a detour route.
Construction Impacts	***Noise*** Noise will be generated by construction equipment used to reconstruct the study-area freeway system. Typical construction equipment would include dump trucks, graders, cranes, bulldozers, pile-driving equipment and pavement construction equipment. The noise generated by this construction equipment will vary greatly, depending upon the equipment type and model, mode and duration of operation, and specific type of work effort; however, typical noise levels may occur in the 75 to 95 dBA range (at 50 feet). Other distance-typical noise level ranges are shown on **Table 3-18.**

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	Variations in building setbacks and land use, local intensity of specific construction activities, and sequencing and timing of construction will result in varying degrees of exposure to construction noise and hence varying levels of resulting impacts. Adverse effects related to construction noise are anticipated to be of a localized, temporary, and transient nature. Construction noise will be controlled in accordance with WisDOT FDM Procedure 23-40-1. In locations where noise walls currently exist, WisDOT will also make every effort to construct new noise walls prior to the demolition of the existing noise walls. To reduce the potential impact of construction noise, special WisDOT provisions for this project will require operation of motorized equipment in compliance with all applicable local, state and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site. All motorized construction equipment would be required to have mufflers constructed in accordance with the equipment manufactures specifications or a system of equivalent noise reducing capacity. WisDOT would also require that mufflers and exhaust systems be maintained in good operating condition, free of leaks and holes. ***Air Quality (Emissions and Dust)*** Demolition and construction activities can result in short-term increases in dust and equipment-related particulate emissions in and around the project area. Equipment-related particulate emissions could be minimized if the equipment is well maintained. The potential air quality impacts will be short-term, occurring only while demolition and construction work is in progress and local conditions are appropriate. Air quality impacts during construction would be generated by motor vehicle, machinery and particulate emissions resulting from earthwork and other construction activities. Construction vehicle activity and the disruption of normal traffic flows may result in increased motor vehicle emissions within certain areas. Construction vehicle emission impacts could be mitigated through implementing and maintaining a comprehensive traffic control plan, enforcing emission standards for gasoline and diesel construction equipment and stipulating that unnecessary idling and equipment operation is to be avoided. Several air quality construction mitigation best practices are available to assist in reducing diesel emission impacts from construction equipment. Off-road diesel engines can contribute significantly to the levels of particulate matter and nitrogen oxides in the air. In recent years, U.S. EPA has set emissions standards for engines used in most new construction equipment. However, construction equipment can last for a long time and it may take several years before all equipment is equipped with engines that meet U.S. EPA standards. In order to combat this, several strategies can be implemented to reduce emissions from the older engines that are in operation today. Reductions in pollutant emissions from older off-road diesel engines can be obtained through a variety of strategies including: reducing idling, properly maintaining equipment, using cleaner fuel, and retrofitting diesel engines with diesel emission control devices. By reducing unnecessary idling at the construction site, emissions will be reduced and fuel will be saved. Proper maintenance of the diesel engine will also allow the engine to perform better and emit less pollution through burning fuel more efficiently. Switching to fuels that contain lower levels of sulfur reduces particulate matter. Using ultra-low sulfur diesel does not require equipment changes or modification. Using fuels that contain a lower level of sulfur also tends to increase the effectiveness of retrofit technologies. Retrofitting off-road construction equipment with diesel emission control devices can reduce particulate matter, nitrogen oxides, carbon monoxide or hydrocarbons, in addition to other air pollutants. Diesel particulate filters can be used to physically trap and oxidize particulate matter in the exhaust stream and diesel oxidation catalysts can be used to oxidize pollutants in the exhaust stream. In the final design phase, WisDOT will consider including these measures on a voluntary or mandatory basis (U.S. EPA, 2008b).

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	Fugitive dust impacts generated by construction would be mitigated by standard dust control measures. These measures may include the frequent watering of construction sites that have large expanses of exposed soil, watering debris generated during the demolition of existing structures, washing construction vehicle tires before they leave construction sites and securing and covering equipment and loose materials prior to travel. Dust control during construction would be accomplished in accordance with WisDOT's Standard Specifications for Road and Bridge Construction (2009b), which requires the application of water or other dust control measures during grading operations and on haul roads. The location and operation of concrete batch plants would be in accordance with the Standard Specifications, and any special provisions developed during coordination with the DNR regarding air quality standards and emissions. Any portable material plants would be operated in accordance with DNR air quality requirements/guidelines. Demolition and disposal of residential or commercial buildings is regulated under DNR's asbestos renovation and demolition requirements (Wisconsin Administrative Code, Chapter NR447). ***Traffic/Conceptual Construction Staging*** *Construction Related Traffic Diversion.* During construction, traffic will be diverted from the study-area freeway system, especially when Zoo Interchange ramps are closed for extended periods. Other freeways and local streets will experience increased traffic volumes as a result. After the construction staging plan is developed WisDOT will analyze how much traffic would be diverted from the study-area freeway system and the routes the traffic would divert to. Several local streets adjacent to the study-area freeway system such as Highway 100, 84th Street, 76th Street, Greenfield Avenue and Bluemound Road, would experience an increase in traffic as a result of vehicles diverting from the study-area freeway system. *Transit, Pedestrian, and Bicycle Impacts.* MCTS Freeway Flyer routes that use the study-area freeway system would be able to pass through the Zoo Interchange using normal routes. Some system ramps in the Zoo Interchange may be closed, requiring Freeway Flyer routes that use these ramps to divert to another route during construction. Local street closures and entrance and exit ramp closures may require bus route modifications. MCTS routes that pass over or under the study-area freeway system on North Avenue, Watertown Plank Road, Bluemound Road, Greenfield Avenue, Highway 100, 84th Street, and 76th Street may have to be modified if these local streets are closed during construction at locations that pass over or under I-94. Pedestrians and bicyclists that cross over or under the study-area freeway system may need to temporarily modify their routes during construction. As noted previously, local street closures would be staged to minimize or avoid closure of adjacent streets at the same time. *Measures to Mitigate Adverse Effects.* During the design phase, WisDOT and FHWA would evaluate the diversion routes to determine if improvements to these routes are necessary. In addition to roadway improvements, signal timing modifications, temporary signals, parking restrictions, intersection improvements, incident management, and demand management options may be instituted during construction to ease potential congestion and delay. Freeway and local street lane closures would be staged to ease disruptions to the extent possible. Other mitigation measures may include the following: • Holding workshops to determine methods to reduce the effects of construction on area businesses, residents, commuters, community services, and special events.

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	• Implementing a community involvement plan to inform the public, including radio, internet, print, and television. • Encouraging the use of transit and carpooling through advertising, temporarily reduced rates, additional routes, and expanded or new park-and-ride lots. • Encouraging businesses to modify their work schedules and/or shipping schedules to avoid peak traffic hours. • Improving detour routes and other routes due to increased traffic resulting from construction. ***Water Quality/Erosion*** Construction in and near waterways would be performed in accordance with WisDOT's Standard Specifications for Road and Bridge Construction (2009b), and Wisconsin Administrative Code Chapter TRANS 401—Construction Site Erosion Control and Stormwater Management Procedures, and the WisDOT/DNR Cooperative Agreement. Appropriate techniques and best management practices, as described in the WisDOT Facilities Development Manual, would be employed to prevent erosion and to minimize siltation to environmentally sensitive resources in the project area. Erosion control devices would be installed before erosion-prone construction activities begin. There is potential for erosion during construction as soils are disturbed by excavation and grading. The project would use standard erosion control devices and best management practices to reduce and control the deposit of sediment into environmentally sensitive resources before erosion-prone construction begins. The construction contractor will be required to prepare an Erosion Control Implementation Plan that includes all erosion control commitments made by WisDOT while planning and designing the project. The construction plans and contract special provisions must include the specific erosion control measures agreed on by WisDOT in consultation with DNR. DNR reviews the Erosion Control Implementation Plan.[2] The following measures may be used during construction: • Minimizing the amount of land exposed at one time • Silt fencing • Sedimentation traps • Dust abatement • Turbidity barriers • Street sweeping • Inlet protection barriers • Temporary seeding • Erosion mats • Ditch or slope sodding • Seeding and mulching exposed soils

[2] Erosion Control will be implemented in accordance with the WisDOT Facilities Development Manual, Chapter 10, Erosion Control and Stormwater Quality; Wisconsin Administrative Code Chapter TRANS 401, Construction Site Erosion Control and Stormwater Management Procedures for Department Actions; and the WisDOT/DNR Cooperative Agreement Amendment, Memorandum of Understanding on Erosion Control and Stormwater Management.

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Affected Environment	Measures to Mitigate Adverse Effects
	Under revisions to the WisDOT/DNR Cooperative Agreement, Memorandum of Understanding on Erosion Control and Stormwater Management, following construction disturbed land would be re-seeded with a mix of fast growing grasses. Drainage systems would be maintained, restored or re-established in a manner that would not impound water. Additional impact mitigation techniques during construction would include the following, as needed, at a particular location: • If dewatering is required, dirty water would be pumped into a stilling, or settling, basin before it is allowed to re-enter a stream. • Trenched-in erosion bales would be installed in areas of moderate velocity runoff; clean-aggregate ditch checks would be installed in ditches with moderate to high velocity runoff during and after construction; and ditches would be protected with erosion bales and matting in conjunction with seeding. • Storing and fueling of construction equipment would be done in upland areas, away from environmentally sensitive areas. Accidental spills during refueling at construction sites or as a result of an accident involving hazardous material haulers would be handled in accordance with local government response procedures. First response would be through local fire departments and emergency service personnel to ensure public safety and to contain immediate threats to the environment. Depending on the nature of the spill, the DNR would then be notified to provide additional instructions regarding cleanup and restoration of any affected resources. The cost of cleanup operations is the responsibility of the contractor or carrier involved in the spill. Further, WisDOT's *Standard Specifications* state that public safety and environmental protection measures shall be enforced by the construction contractor (WisDOT, 2008c). • Contractors would be required to follow DNR guidelines for ensuring that construction equipment used in or near waterways is adequately decontaminated for zebra mussels and plant exotics including purple loosestrife and Eurasian milfoil. Section 3.11 provides additional information regarding water quality mitigation and best management practices. ***Vibration*** Ground-borne vibration has the potential to affect nearby buildings. Blasting and impact pile driving are traditionally associated with high levels of vibration. Excavation and backfilling can generate vibration that is perceptible or noticeable in nearby buildings. Vibration created by the movement of construction vehicles such as graders, loaders, dozers, scrapers and trucks are generally the same order of magnitude as the vibration caused by heavy vehicles traveling on streets and highways. In general, groundborne vibration from vehicles on streets is not sufficient to impact adjacent buildings. Buildings that are in good structural condition would likely not be affected by construction-related vibration. WisDOT will coordinate with adjacent property owners prior to construction to determine if any buildings near construction areas are in poor structural condition. For construction work that occurs in the City of Milwaukee, WisDOT will meet City of Milwaukee vibration ordinances. In communities that do not have vibration ordinances, WisDOT will comply with the Wisconsin Department of Workforce Development (formerly Department of Industry, Labor and Human Relations) vibration regulations. ***Material Source/Disposal Sites*** The construction contractor is responsible for the selection of material source sites. Material would most likely be obtained from local existing quarry sites. Unusable excavated material would be disposed of by the contractor in accordance with WisDOT's Standard Specifications for Road

APPENDIX A
Summary of Measures to Mitigate Adverse Effects

Affected Environment	Measures to Mitigate Adverse Effects
	and Bridge Construction, or special provisions to ensure protection of wetlands and waterways. Local zoning, reclamation plans, and other approvals may be needed for material source/disposal sites (WisDOT, 2009b). Soil and excavated material (including vegetation) would be stockpiled or disposed of in an upland area, away from wetlands, streams, and other open water; and, where applicable, silt fence would be placed between the disposal area and wetland and open water areas. If any material sources are necessary to construct the project, appropriate erosion control measures would be applied to these sites during and following construction; and following use, such sites would be properly seeded, mulched, and protected from erosion. Any portable materials plants would be properly treated to prevent erosion, and DNR would be able to review site plans, including any gravel washing operations, high-capacity wells, and site closure/restoration.

Appendix B

Traffic Noise Impact Summary

APPENDIX B

Traffic Noise Impact Summary – 6-Lane Modernization Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level N1	Sound Levels Leq (dBA): Future Noise Level N3	Sound Levels Leq (dBA): Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	Impact Evaluation: Difference in Future and Existing Noise Levels (Col e minus Col f) N3	Impact Evaluation: Difference in Future Noise Levels and NAC (Col d minus Col c) N1	Impact Evaluation: Difference in Future Noise Levels and NAC (Col e minus Col c) N3	Impact or No Impact (**) N1	Impact or No Impact (**) N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N1	Res (6)	67	67	65	76	-9	-11	0	-2	I	N
N2	Res (16)	67	64	65	72	-8	-7	-3	-2	N	N
N3	Res (6)	67	60	62	68	-8	-6	-7	-5	N	N
N4	School/Daycare	67	57	60	65	-8	-5	-10	-7	N	N
N5	Church	67	64	64	68	-4	-4	-3	-3	N	N
N6	Res (2)	67	61	65	67	-6	-2	-6	-2	N	N
N7	Res (4)/Church	67	63	67	70	-7	-3	-4	0	N	I
N8	Res (5)	67	67	69	73	-6	-4	0	2	I	I
N9	Res (1)	67	58	62	63	-5	-1	-9	-5	N	N
N10	Res (1)	67	56	67	68	-12	-1	-11	0	N	I
N11	Com (1)	72	62	60	61	1	-1	-10	-12	N	N
N12	Res (1)	67	63	63	66	-3	-3	-4	-4	N	N
N13	Res (1)	67	63	62	67	-4	-5	-4	-5	N	N
N14	School	67	66	66	66	0	0	-1	-1	I	I
N15	Res (1)	67	55	55	61	-6	-6	-12	-12	N	N
N16	Res (2)	67	62	62	61	1	1	-5	-5	N	N
N17	Res (1)	67	60	60	60	0	0	-7	-7	N	N
N18	Res (1)	67	59	59	60	-1	-1	-8	-8	N	N

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 6-Lane Modernization Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA) Future Noise Level N1	Future Noise Level N3	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	(Col e minus Col f) N3	Difference in Future Noise Levels and NAC (Col d minus Col c) N1	(Col e minus Col c) N3	Impact or No Impact (**) N1	N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N19	Com (1)	72	70	70	74	-4	-4	-2	-2	N	N
N20	Res (12)	67	74	74	75	-1	-1	7	7	I	I
N21	Res (1)	67	66	66	69	-3	-3	-1	-1	I	I
N22	Res (6)	67	67	67	66	1	1	0	0	I	I
N23	Res (8)	67	67	67	68	-1	-1	0	0	I	I
N24	Res (3)	67	71	71	75	-4	-4	4	4	I	I
N25	Res (3)	67	70	70	75	-5	-5	3	3	I	I
N26	Res (5)	67	69	69	75	-6	-6	2	2	I	I
N27	Res (3)	67	64	64	74	-10	-10	-3	-3	N	N
N28	Res (3)	67	62	62	68	-6	-6	-5	-5	N	N
N29	Res (3)	67	62	62	67	-5	-5	-5	-5	N	N
N30	Res (2)	67	63	63	67	-4	-4	-4	-4	N	N
N31	School	67	64	64	68	-4	-4	-3	-3	N	N
N32	Tennis Court	67	66	66	71	-5	-5	-1	-1	I	I
N33	Com (1)	72	76	76	76	0	0	4	4	I	I
N34	Com (1)	72	72	72	70	2	2	0	0	I	I
N35	Com (1)	72	72	72	71	1	1	0	0	I	I
N36	Athletic Field	67	75	75	75	0	0	8	8	I	I

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 6-Lane Modernization Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level N1	Future Noise Level N3	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	(Col e minus Col f) N3	Difference in Future Noise Levels and NAC (Col d minus Col c) N1	(Col e minus Col c) N3	Impact or No Impact (**) N1	Impact or No Impact (**) N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N37	School	67	78	78	77	1	1	11	11	I	I
N38	School	67	66	66	68	-2	-2	-1	-1	I	I
N39	Res (2)	67	69	69	70	-1	-1	2	2	I	I
N40	Res (5)	67	66	66	70	-4	-4	-1	-1	I	I
N41	Res (4)	67	64	64	72	-8	-8	-3	-3	N	N
N42	Res (2)	67	66	66	76	-10	-10	-1	-1	I	I
N43	Res (5)	67	63	63	72	-9	-9	-4	-4	N	N
N44	Res (6)	67	63	63	70	-7	-7	-4	-4	N	N
N45	Res (5)	67	71	71	73	-2	-2	4	4	I	I
N46	Res (6)	67	70	70	73	-3	-3	3	3	I	I
N47	Res (5)	67	66	66	68	-2	-2	-1	-1	I	I
N48	Res (8)	67	65	65	67	-2	-2	-2	-2	N	N
N49	Res (2)	67	63	63	66	-3	-3	-4	-4	N	N
N50	Res (3)	67	76	76	76	0	0	9	9	I	I
N51	Res (2)	67	76	76	75	1	1	9	9	I	I
N52	Res (3)	67	76	76	76	0	0	9	9	I	I
N53	Com (1)	72	66	66	71	-5	-5	-6	-6	N	N
N54	Com (1)	72	62	62	70	-8	-8	-10	-10	N	N

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 6-Lane Modernization Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level N1	Future Noise Level N3	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	(Col e minus Col f) N3	Difference in Future Noise Levels and NAC (Col d minus Col c) N1	(Col e minus Col c) N3	Impact or No Impact (**) N1	N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N55	Park	67	70	70	69	1	1	3	3	I	I
N56	Com (1)	72	59	59	66	-7	-7	-13	-13	N	N
N57	Com (1)	72	64	65	66	-2	-1	-8	-7	N	N
N58	Com (1)	72	61	61	62	-1	-1	-11	-11	N	N
N59	Com (1)	72	60	68	72	-12	-4	-12	-4	N	N
N60	Com (1)	72	63	66	65	-2	1	-9	-6	N	N
N61	Res (4)	67	66	71	68	-2	3	-1	4	I	I
N62	Res (9)	67	68	70	71	-3	-1	1	3	I	I
N63	Res (3)	67	66	68	74	-8	-6	-1	1	I	I
N64	Com (1)	72	--	73	71	--	2	--	1	--	I

APPENDIX B

Traffic Noise Impact Summary – 6-Lane Modernization Alternative, East Leg –E1/E3 Hybrid Alternative and E1

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level E1/E3	Sound Levels Leq (dBA): Future Noise Level E1	Sound Levels Leq (dBA): Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) E1/E3	Impact Evaluation: Difference in Future and Existing Noise Levels (Col e minus Col f) E1	Impact Evaluation: Difference in Future Noise Levels and NAC (Col d minus Col c) E1/E3	Impact Evaluation: Difference in Future Noise Levels and NAC (Col e minus Col c) E1	Impact or No Impact (**) E1/E3	Impact or No Impact (**) E1
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N65	Res (1)	67	65	65	66	-1	-1	-2	-2	N	N
N66	Res (2)	67	70	70	70	0	0	3	3	I	I
N67	Res (4)	67	69	71	72	-3	-1	2	4	I	I
N68	Res (2)	67	65	65	70	-5	-5	-2	-2	N	N
N69	Res (1)	67	66	66	73	-7	-7	-1	-1	I	I
N70	Res (2)	67	73	70	75	-2	-5	6	3	I	I
N71	Com (1)	72	70	68	74	-4	-6	-2	-4	N	N
N72	Com (2)	72	65	65	69	-4	-4	-7	-7	N	N
N73	Res (1)	67	67	66	73	-6	-7	0	-1	I	I
N74	Res (1)	67	62	62	68	-6	-6	-5	-5	N	N
N75	Com (1)	72	67	68	68	-1	0	0	1	I	I
N76	Res (2)	67	67	68	66	1	2	0	1	I	I
N77	Res (2)	67	66	67	65	1	2	-1	0	I	I
N78	Res (1)	67	64	68	63	1	5	-3	1	N	I
N79	Res (2)	67	64	62	63	1	-1	-3	-5	N	N
N80	Res (2)	67	60	64	64	-4	0	-7	-3	N	N
N81	Res (2)	67	62	64	62	0	2	-5	-3	N	N
N82	Res (2)	67	68	72	64	4	8	1	5	I	I

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 6-Lane Modernization Alternative, East Leg – E1/E3 Hybrid Alternative, E1

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA) Future Noise Level E1/E3	Future Noise Level E1	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) E1/E3	(Col e minus Col f) E1	Difference in Future Noise Levels and NAC (Col d minus Col c) E1/E3	(Col e minus Col c) E1	Impact or No Impact (**) E1/E3	Impact or No Impact (**) E1
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N83	Res (3)	67	68	68	68	0	0	1	1	I	I
N84	Res (3)	67	69	69	69	0	0	2	2	I	I
N85	Res (2)	67	73	73	73	0	0	6	6	I	I
N86	Res (2)	67	73	73	72	1	1	6	6	I	I
N87	Res (2)	67	66	66	69	-3	-3	-1	-1	I	I
N88	Res (2)	67	71	71	73	-2	-2	4	4	I	I
N89	Res (2)	67	68	68	69	-1	-1	1	1	I	I
N90	Res (2)	67	72	69	74	-2	-5	5	2	I	I
N91	Res (2)	67	68	66	68	0	-2	1	-1	I	I
N92	Res (2)	67	67	65	74	-7	-9	0	-2	I	N
N93	Res (3)	67	65	65	71	-6	-6	-2	-2	N	N
N94	Res (1)	67	65	66	73	-8	-7	-2	-1	N	I
N95	Res (2)	67	63	67	73	-10	-6	-4	0	N	I
N96	Res (2)	67	63	68	72	-9	-4	-4	1	N	I
N97	Res (4)	67	63	73	75	-12	-2	-4	6	N	I
N98	Res (4)	67	63	74	75	-12	-1	-4	7	N	I
N99	Res (4)	67	63	73	75	-12	-2	-4	6	N	I
N100	Res (2)/Church	67	64	72	74	-10	-2	-3	5	N	I
N101	Res (3)	67	66	69	74	-8	-5	-1	2	I	I

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 6-Lane Modernization Alternative, East Leg – E1/E3 Hybrid Alternative, E1

		Sound Levels Leq (dBA)				Impact Evaluation					
						Difference in Future and Existing Noise Levels		Difference in Future Noise Levels and NAC		Impact or No Impact (**)	
						(Col d minus Col f)	(Col e minus Col f)	(Col d minus Col c)	(Col e minus Col c)		
Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Future Noise Level E1/E3	Future Noise Level E1	Existing Noise Level	E1/E3	E1	E1/E3	E1	E1/E3	E1
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N102	Res (3)	67	65	67	73	-8	-6	-2	0	N	I
N103	Res (5)	67	64	69	69	-5	0	-3	2	N	I
N104	Res (5)	67	66	68	73	-7	-5	-1	1	I	I
N105	Res (6)	67	65	64	72	-7	-8	-2	-3	N	N
N106	Res (1)	67	66	62	70	-4	-8	-1	-5	I	N
N107	Res (3)	67	67	67	69	-2	-2	0	0	I	I
N108	Res (1)	67	68	67	74	-6	-7	1	0	I	I
N109	Res (3)	67	--	67	74	--	-7	--	0	--	I
N110	Res (2)	67	--	68	77	--	-9	--	1	--	I
N111	Res (5)	67	--	70	75	--	-5	--	3	--	I
N131	Com (1)	72	64	64	68	-4	-4	-8	-8	N	N

APPENDIX B
Traffic Noise Impact Summary – 6-Lane Alternative, South Leg – S2

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA) Future Noise Level S2	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col e) S2	Difference in Future Noise Levels and NAC (Col d minus Col c) S2	Impact or No Impact (**) S2
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N112	Church	67	69	71	-2	2	I
N113	Res (5)	67	64	67	-3	-3	N
N114	Res (9)	67	67	70	-3	0	I
N115	Res (3)	67	72	74	-2	5	I
N116	Com (1)	72	66	69	-3	-6	N
N117	Res (8)	67	61	64	-3	-6	N
N118	Res (4)	67	60	63	-3	-7	N
N119	Com (1)	72	61	67	-6	-11	N
N120	Res (4)	67	66	69	-3	-1	I
N121	Res (10)	67	65	71	-6	-2	N
N122	Res (4)	67	61	70	-9	-6	N
N123	Com (1)	72	64	65	-1	-8	N
N124	Com (1)	72	71	71	0	-1	I
N125	Res (7)	67	71	71	0	4	I
N126	Res (11)	67	70	72	-2	3	I
N127	Res (9)	67	72	72	0	5	I
N128	Res (11)	67	68	68	0	1	I
N129	Res (5)	67	68	67	1	1	I
N130	Com (1)	72	68	66	2	-4	N

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 6-Lane Alternative, South Leg – S2

		Sound Levels Leq (dBA)			Impact Evaluation		
					Difference in Future and Existing Noise Levels	Difference in Future Noise Levels and NAC	
Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Future Noise Level	Existing Noise Level	(Col d minus Col e)	(Col d minus Col c)	Impact or No Impact (**)
			S2		S2	S2	S2
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N132	Res (1)	67	60	59	1	-7	N
N133	Res (5)	67	57	61	-4	-10	N
N134	Res (5)	67	58	61	-3	-9	N
N135	Res (9)	67	63	62	1	-4	N
N136	Res (6)	67	72	63	9	5	I
N137	Res (2)/Church	67	72	66	6	5	I
N138	Res (2)/School	67	68	72	-4	1	I
N139	Com (1)	72	65	71	-6	-7	N
N140	Com (1)	72	72	75	-3	0	I
N141	Res (4)	67	77	77	0	10	I
N142	Res (12)	67	75	77	-2	8	I
N143	Res (6)	67	67	69	-2	0	I
N144	Com (1)	72	67	70	-3	-5	N
N145	Res (16)	67	66	62	4	-1	I
N146	Res (16)	67	70	62	8	3	I
N147	Res (16)	67	72	63	9	5	I
N148	Res (4)	67	77	64	13	10	I
N149	Res (10)	67	70	61	9	3	I

APPENDIX B (CONTINUED)
Traffic Noise Impact Summary – 6-Lane Alternative, South Leg – S2

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Sound Levels Leq (dBA)			Impact Evaluation		
		Noise Abatement Criteria (NAC)	Future Noise Level	Existing Noise Level	Difference in Future and Existing Noise Levels (Col d minus Col e)	Difference in Future Noise Levels and NAC (Col d minus Col c)	Impact or No Impact (**)
			S2		S2	S2	S2
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N150	Res (8)	67	69	60	9	2	I
N170	Com (1)	72	62	60	2	-10	N
N171	Res (7)	67	61	62	-1	-6	N

APPENDIX B

Traffic Noise Impact Summary – 6-Lane Alternative, West Leg – W3

		Sound Levels Leq (dBA)			Impact Evaluation		
Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Future Noise Level W3	Existing Noise Level	Difference in Future and Existing Noise Levels (Col d minus Col e) W3	Difference in Future Noise Levels and NAC (Col d minus Col c) W3	Impact or No Impact (**) W3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N151	Com (1)	72	71	71	0	-1	I
N152	Com (1)	72	71	71	0	-1	I
N153	Res (1)	67	67	68	-1	0	I
N154	Com (3)	72	71	72	-1	-1	I
N155	Com (1)	72	69	69	0	-3	N
N156	Com (1)	72	69	68	1	-3	N
N157	Com (1)	72	66	66	0	-6	N
N158	Res (2)	67	64	65	-1	-3	N
N159	Res (2)	67	64	66	-2	-3	N
N160	Res (2)	67	64	66	-2	-3	N
N161	Res (2)	67	64	67	-3	-3	N
N162	Res (2)	67	65	68	-3	-2	N
N163	Res (2)	67	63	67	-4	-4	N
N164	Res (4)	67	65	69	-4	-2	N
N165	Res (4)	67	63	68	-5	-4	N
N166	Com (1)	72	64	65	-1	-8	N
N167	Zoo	67	66	68	-2	-1	I
N168	Zoo	67	68	69	-1	1	I
N169	Zoo	67	62	60	2	-5	N

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 6-Lane Alternative, West Leg – W3

		Sound Levels Leq (dBA)			Impact Evaluation		
					Difference in Future and Existing Noise Levels	Difference in Future Noise Levels and NAC	
Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Future Noise Level	Existing Noise Level	(Col d minus Col e)	(Col d minus Col c)	Impact or No Impact (**)
			W3		W3	W3	W3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N172	Res (6)	67	62	61	1	-5	N
N173	Res (7)	67	61	61	0	-6	N
N174	Res (10)	67	63	62	1	-4	N
N175	Res (1)	67	62	61	1	-5	N
N176	Com (1)	72	63	63	0	-9	N
N177	Com (1)	72	62	65	-3	-10	N
N178	Com (1)	72	69	69	0	-3	N
N179	Com (2)	72	70	71	-1	-2	N
N180	Com (1)	72	72	71	1	0	I

Notes:

(*) Com – commercial site; Res (1) – residential site, 1 dwelling; Res (2) – residential site, 2 dwellings, -- acquired property, etc.

(**) Wisconsin Administrative Code – TRANS 405.54.04 (2)(b) (Site Criteria and Policies)

Source – HNTB April 2009

APPENDIX B

Traffic Noise Impact Summary – 8-Lane Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA) Future Noise Level N1	Sound Levels Leq (dBA) Future Noise Level N3	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	Difference in Future and Existing Noise Levels (Col e minus Col f) N3	Difference in Future Noise Levels and NAC (Col d minus Col c) N1	Difference in Future Noise Levels and NAC (Col e minus Col c) N3	Impact or No Impact (**) N1	Impact or No Impact (**) N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N1	Res (6)	67	67	66	76	-9	-10	0	-1	I	I
N2	Res (16)	67	65	65	72	-7	-7	-2	-2	N	N
N3	Res (6)	67	60	62	68	-8	-6	-7	-5	N	N
N4	School/Daycare	67	57	61	65	-8	-4	-10	-6	N	N
N5	Church	67	64	64	68	-4	-4	-3	-3	N	N
N6	Res (2)	67	61	66	67	-6	-1	-6	-1	N	I
N7	Res (4)/Church	67	63	68	70	-7	-2	-4	1	N	I
N8	Res (5)	67	68	70	73	-5	-3	1	3	I	I
N9	Res (1)	67	59	63	63	-4	0	-8	-4	N	N
N10	Res (1)	67	56	68	68	-12	0	-11	1	N	I
N11	Com (1)	72	62	61	61	1	0	-10	-11	N	N
N12	Res (1)	67	63	63	66	-3	-3	-4	-4	N	N
N13	Res (1)	67	63	63	67	-4	-4	-4	-4	N	N
N14	School	67	67	67	66	1	1	0	0	I	I
N15	Res (1)	67	56	56	61	-5	-5	-11	-11	N	N
N16	Res (2)	67	62	62	61	1	1	-5	-5	N	N
N17	Res (1)	67	61	61	60	1	1	-6	-6	N	N

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 8-Lane Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level N1	Sound Levels Leq (dBA): Future Noise Level N3	Sound Levels Leq (dBA): Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	Impact Evaluation: Difference in Future and Existing Noise Levels (Col e minus Col f) N3	Impact Evaluation: Difference in Future Noise Levels and NAC (Col d minus Col c) N1	Impact Evaluation: Difference in Future Noise Levels and NAC (Col e minus Col c) N3	Impact or No Impact (**) N1	Impact or No Impact (**) N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N18	Res (1)	67	60	60	60	0	0	-7	-7	N	N
N19	Com (1)	72	70	70	74	-4	-4	-2	-2	N	N
N20	Res (12)	67	74	74	75	-1	-1	7	7	I	I
N21	Res (1)	67	67	67	69	-2	-2	0	0	I	I
N22	Res (6)	67	68	68	66	2	2	1	1	I	I
N23	Res (8)	67	67	67	68	-1	-1	0	0	I	I
N24	Res (3)	67	72	72	75	-3	-3	5	5	I	I
N25	Res (3)	67	70	70	75	-5	-5	3	3	I	I
N26	Res (5)	67	69	69	75	-6	-6	2	2	I	I
N27	Res (3)	67	64	64	74	-10	-10	-3	-3	N	N
N28	Res (3)	67	63	63	68	-5	-5	-4	-4	N	N
N29	Res (3)	67	63	63	67	-4	-4	-4	-4	N	N
N30	Res (2)	67	63	63	67	-4	-4	-4	-4	N	N
N31	School	67	64	64	68	-4	-4	-3	-3	N	N
N32	Tennis Court	67	67	67	71	-4	-4	0	0	I	I
N33	Com (1)	72	77	77	76	1	1	5	5	I	I

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 8-Lane Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level N1	Sound Levels Leq (dBA): Future Noise Level N3	Sound Levels Leq (dBA): Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	Impact Evaluation: Difference in Future and Existing Noise Levels (Col e minus Col f) N3	Impact Evaluation: Difference in Future Noise Levels and NAC (Col d minus Col c) N1	Impact Evaluation: Difference in Future Noise Levels and NAC (Col e minus Col c) N3	Impact or No Impact (**) N1	Impact or No Impact (**) N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N34	Com (1)	72	72	72	70	2	2	0	0	I	I
N35	Com (1)	72	73	73	71	2	2	1	1	I	I
N36	Athletic Field	67	76	76	75	1	1	9	9	I	I
N37	School	67	78	78	77	1	1	11	11	I	I
N38	School	67	66	66	68	-2	-2	-1	-1	I	I
N39	Res (2)	67	69	69	70	-1	-1	2	2	I	I
N40	Res (5)	67	67	67	70	-3	-3	0	0	I	I
N41	Res (4)	67	64	64	72	-8	-8	-3	-3	N	N
N42	Res (2)	67	66	66	76	-10	-10	-1	-1	I	I
N43	Res (5)	67	63	63	72	-9	-9	-4	-4	N	N
N44	Res (6)	67	64	64	70	-6	-6	-3	-3	N	N
N45	Res (5)	67	71	71	73	-2	-2	4	4	I	I
N46	Res (6)	67	71	71	73	-2	-2	4	4	I	I
N47	Res (5)	67	67	67	68	-1	-1	0	0	I	I
N48	Res (8)	67	65	65	67	-2	-2	-2	-2	N	N
N49	Res (2)	67	64	64	66	-2	-2	-3	-3	N	N
N50	Res (3)	67	77	77	76	1	1	10	10	I	I

APPENDIX B (CONTINUED)
Traffic Noise Impact Summary – 8-Lane Alternative, North Leg N1, N3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA) Future Noise Level N1	Future Noise Level N3	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) N1	(Col e minus Col f) N3	Difference in Future Noise Levels and NAC (Col d minus Col c) N1	(Col e minus Col c) N3	Impact or No Impact (**) N1	Impact or No Impact (**) N3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N51	Res (2)	67	77	77	75	2	2	10	10	I	I
N52	Res (3)	67	77	77	76	1	1	10	10	I	I
N53	Com (1)	72	66	66	71	-5	-5	-6	-6	N	N
N54	Com (1)	72	62	62	70	-8	-8	-10	-10	N	N
N55	Park	67	70	70	69	1	1	3	3	I	I
N56	Com (1)	72	60	59	66	-6	-7	-12	-13	N	N
N57	Com (1)	72	64	65	66	-2	-1	-8	-7	N	N
N58	Com (1)	72	61	62	62	-1	0	-11	-10	N	N
N59	Com (1)	72	61	69	72	-11	-3	-11	-3	N	N
N60	Com (1)	72	64	67	65	-1	2	-8	-5	N	N
N61	Res (4)	67	67	71	68	-1	3	0	4	I	I
N62	Res (9)	67	69	71	71	-2	0	2	4	I	I
N63	Res (3)	67	67	69	74	-7	-5	0	2	I	I
N64	Com (1)	72	--	74	71	--	3	--	2	--	I

APPENDIX B

Traffic Noise Impact Summary – 8-Lane Alternative, East Leg – E1/E3 Hybrid Alternative and E1

			Sound Levels Leq (dBA)			Impact Evaluation					
						Difference in Future and Existing Noise Levels		Difference in Future Noise Levels and NAC		Impact or No Impact (**)	
			Future Noise Level			(Col d minus Col f)	(Col e minus Col f)	(Col d minus Col c)	(Col e minus Col c)		
Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	E1/E3	E1	Existing Noise Level	E1/E3	E1	E1/E3	E1	E1/E3	E1
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N65	Res (1)	67	65	65	66	-1	-1	-2	-2	N	N
N66	Res (2)	67	70	71	70	0	1	3	4	I	I
N67	Res (4)	67	70	72	72	-2	0	3	5	I	I
N68	Res (2)	67	66	66	70	-4	-4	-1	-1	I	I
N69	Res (1)	67	67	67	73	-6	-6	0	0	I	I
N70	Res (2)	67	73	71	75	-2	-4	6	4	I	I
N71	Com (1)	72	71	69	74	-3	-5	-1	-3	I	N
N72	Com (2)	72	66	66	69	-3	-3	-6	-6	N	N
N73	Res (1)	67	68	66	73	-5	-7	1	-1	I	I
N74	Res (1)	67	63	63	68	-5	-5	-4	-4	N	N
N75	Com (1)	72	68	68	68	0	0	1	1	I	I
N76	Res (2)	67	68	69	66	2	3	1	2	I	I
N77	Res (2)	67	67	68	65	2	3	0	1	I	I
N78	Res (1)	67	64	69	63	1	6	-3	2	N	I
N79	Res (2)	67	65	63	63	2	0	-2	-4	N	N
N80	Res (2)	67	61	64	64	-3	0	-6	-3	N	N
N81	Res (2)	67	62	65	62	0	3	-5	-2	N	N

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 8-Lane Alternative, East Leg – E1/E3 Hybrid Alternative and E1

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level E1/E3	Future Noise Level E1	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) E1/E3	(Col e minus Col f) E1	Difference in Future Noise Levels and NAC (Col d minus Col c) E1/E3	(Col e minus Col c) E1	Impact or No Impact (**) E1/E3	Impact or No Impact (**) E1
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N82	Res (2)	67	69	72	64	5	8	2	5	I	I
N83	Res (3)	67	69	68	68	1	0	2	1	I	I
N84	Res (3)	67	70	70	69	1	1	3	3	I	I
N85	Res (2)	67	74	74	73	1	1	7	7	I	I
N86	Res (2)	67	74	74	72	2	2	7	7	I	I
N87	Res (2)	67	67	67	69	-2	-2	0	0	I	I
N88	Res (2)	67	72	72	73	-1	-1	5	5	I	I
N89	Res (2)	67	69	68	69	0	-1	2	1	I	I
N90	Res (2)	67	72	70	74	-2	-4	5	3	I	I
N91	Res (2)	67	69	67	68	1	-1	2	0	I	I
N92	Res (2)	67	68	66	74	-6	-8	1	-1	I	I
N93	Res (3)	67	66	66	71	-5	-5	-1	-1	I	I
N94	Res (1)	67	66	67	73	-7	-6	-1	0	I	I
N95	Res (2)	67	64	68	73	-9	-5	-3	1	N	I
N96	Res (2)	67	63	69	72	-9	-3	-4	2	N	I
N97	Res (4)	67	64	74	75	-11	-1	-3	7	N	I
N98	Res (4)	67	64	75	75	-11	0	-3	8	N	I

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 8-Lane Alternative, East Leg – E1/E3 Hybrid Alternative and E1

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Sound Levels Leq (dBA) Noise Abatement Criteria (NAC)	Future Noise Level E1/E3	Future Noise Level E1	Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col f) E1/E3	(Col e minus Col f) E1	Difference in Future Noise Levels and NAC (Col d minus Col c) E1/E3	(Col e minus Col c) E1	Impact or No Impact (**) E1/E3	Impact or No Impact (**) E1
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		
N99	Res (4)	67	64	74	75	-11	-1	-3	7	N	I
N100	Res (2)/Church	67	65	73	74	-9	-1	-2	6	N	I
N101	Res (3)	67	67	69	74	-7	-5	0	2	I	I
N102	Res (3)	67	66	68	73	-7	-5	-1	1	I	I
N103	Res (5)	67	65	70	69	-4	1	-2	3	N	I
N104	Res (5)	67	67	69	73	-6	-4	0	2	I	I
N105	Res (6)	67	66	65	72	-6	-7	-1	-2	I	N
N106	Res (1)	67	67	63	70	-3	-7	0	-4	I	N
N107	Res (3)	67	67	67	69	-2	-2	0	0	I	I
N108	Res (1)	67	69	68	74	-5	-6	2	1	I	I
N109	Res (3)	67	--	68	74	--	-6	--	1	--	I
N110	Res (2)	67	--	69	77	--	-8	--	2	--	I
N111	Res (5)	67	--	71	75	--	-4	--	4	--	I
N131	Com (1)	72	65	65	68	-3	-3	-7	-7	N	N

APPENDIX B

Traffic Noise Impact Summary – 8-Lane Alternative, South Leg – S2

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level	Sound Levels Leq (dBA): Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col e)	Impact Evaluation: Difference in Future Noise Levels and NAC (Col d minus Col c)	Impact or No Impact (**)
			S2		S2	S2	S2
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N112	Church	67	70	71	-1	3	I
N113	Res (5)	67	64	67	-3	-3	N
N114	Res (9)	67	67	70	-3	0	I
N115	Res (3)	67	73	74	-1	6	I
N116	Com (1)	72	66	69	-3	-6	N
N117	Res (8)	67	61	64	-3	-6	N
N118	Res (4)	67	61	63	-2	-6	N
N119	Com (1)	72	62	67	-5	-10	N
N120	Res (4)	67	66	69	-3	-1	I
N121	Res (10)	67	65	71	-6	-2	N
N122	Res (4)	67	61	70	-9	-6	N
N123	Com (1)	72	64	65	-1	-8	N
N124	Com (1)	72	72	71	1	0	I
N125	Res (7)	67	71	71	0	4	I
N126	Res (11)	67	70	72	-2	3	I
N127	Res (9)	67	72	72	0	5	I
N128	Res (11)	67	68	68	0	1	I
N129	Res (5)	67	69	67	2	2	I

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 8-Lane Alternative, South Leg – S2

		Sound Levels Leq (dBA)			Impact Evaluation		
Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Future Noise Level	Existing Noise Level	Difference in Future and Existing Noise Levels (Col d minus Col e)	Difference in Future Noise Levels and NAC (Col d minus Col c)	Impact or No Impact (**)
			S2		S2	S2	S2
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N130	Com (1)	72	69	66	3	-3	N
N132	Res (1)	67	61	59	2	-6	N
N133	Res (5)	67	58	61	-3	-9	N
N134	Res (5)	67	58	61	-3	-9	N
N135	Res (9)	67	63	62	1	-4	N
N136	Res (6)	67	72	63	9	5	I
N137	Res (2)/Church	67	72	66	6	5	I
N138	Res (2)/School	67	69	72	-3	2	I
N139	Com (1)	72	66	71	-5	-6	N
N140	Com (1)	72	73	75	-2	1	I
N141	Res (4)	67	78	77	1	11	I
N142	Res (12)	67	75	77	-2	8	I
N143	Res (6)	67	67	69	-2	0	I
N144	Com (1)	72	67	70	-3	-5	N
N145	Res (16)	67	66	62	4	-1	I
N146	Res (16)	67	71	62	9	4	I
N147	Res (16)	67	73	63	10	6	I
N148	Res (4)	67	78	64	14	11	I

APPENDIX B (CONTINUED)

Traffic Noise Impact Summary – 8-Lane Alternative, South Leg – S2

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Sound Levels Leq (dBA): Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level	Sound Levels Leq (dBA): Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col e)	Impact Evaluation: Difference in Future Noise Levels and NAC (Col d minus Col c)	Impact Evaluation: Impact or No Impact (**)
			S2		S2	S2	S2
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N149	Res (10)	67	71	61	10	4	I
N150	Res (8)	67	69	60	9	2	I
N170	Com (1)	72	62	60	2	-10	N
N171	Res (7)	67	61	62	-1	-6	N

APPENDIX B
Traffic Noise Impact Summary – 8-Lane Alternative, West Leg – W3

Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Sound Levels Leq (dBA): Future Noise Level	Sound Levels Leq (dBA): Existing Noise Level	Impact Evaluation: Difference in Future and Existing Noise Levels (Col d minus Col e)	Impact Evaluation: Difference in Future Noise Levels and NAC (Col d minus Col c)	Impact Evaluation: Impact or No Impact (**)
			W3		W3	W3	W3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N151	Com (1)	72	71	71	0	-1	I
N152	Com (1)	72	71	71	0	-1	I
N153	Res (1)	67	68	68	0	1	I
N154	Com (3)	72	71	72	-1	-1	I
N155	Com (1)	72	69	69	0	-3	N
N156	Com (1)	72	69	68	1	-3	N
N157	Com (1)	72	66	66	0	-6	N
N158	Res (2)	67	64	65	-1	-3	N
N159	Res (2)	67	64	66	-2	-3	N
N160	Res (2)	67	64	66	-2	-3	N
N161	Res (2)	67	64	67	-3	-3	N
N162	Res (2)	67	65	68	-3	-2	N
N163	Res (2)	67	64	67	-3	-3	N
N164	Res (4)	67	66	69	-3	-1	I
N165	Res (4)	67	63	68	-5	-4	N
N166	Com (1)	72	65	65	0	-7	N
N167	Zoo	67	66	68	-2	-1	I
N168	Zoo	67	69	69	0	2	I

APPENDIX B (CONTINUED)
Traffic Noise Impact Summary – 8-Lane Alternative, West Leg – W3

		Sound Levels Leq (dBA)			Impact Evaluation		
Receptor Location (See Exhibit x-x and x-x)	Number of Residences, Schools, etc., Typical of this Receptor Site (*)	Noise Abatement Criteria (NAC)	Future Noise Level	Existing Noise Level	Difference in Future and Existing Noise Levels (Col d minus Col e)	Difference in Future Noise Levels and NAC (Col d minus Col c)	Impact or No Impact (**)
			W3		W3	W3	W3
(a)	(b)	(c)	(d)	(e)	(f)	(g)	
N169	Zoo	67	62	60	2	-5	N
N172	Res (6)	67	62	61	1	-5	N
N173	Res (7)	67	61	61	0	-6	N
N174	Res (10)	67	63	62	1	-4	N
N175	Res (1)	67	63	61	2	-4	N
N176	Com (1)	72	63	63	0	-9	N
N177	Com (1)	72	62	65	-3	-10	N
N178	Com (1)	72	69	69	0	-3	N
N179	Com (2)	72	70	71	-1	-2	N
N180	Com (1)	72	72	71	1	0	I

Notes:

(*) Com – commercial site; Res (1) – residential site, 1 dwelling; Res (2) – residential site, 2 dwellings, -- acquired property, etc.

(**) Wisconsin Administrative Code – TRANS 405.54.04 (2)(b) (Site Criteria and Policies)

Appendix C
Mobile Source Air Toxics

APPENDIX C

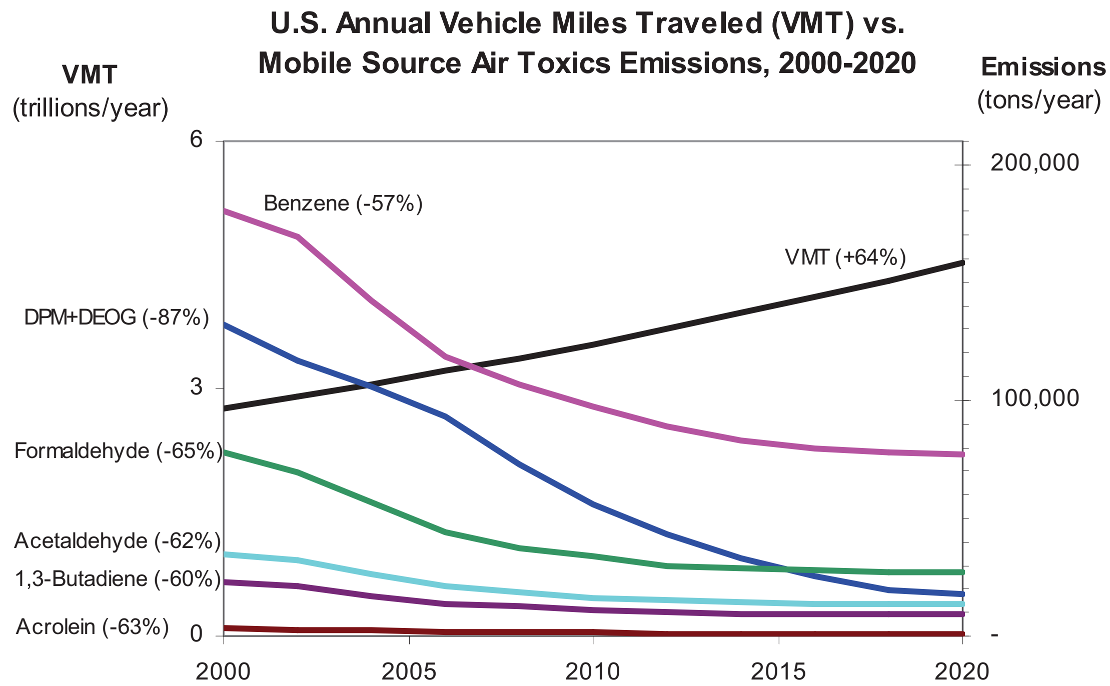
Mobile Source Air Toxics

In February, 2006, FHWA issued guidance for the analysis of mobile source air toxics (MSATs) in the NEPA process for highway projects (*Interim Guidance on Air Toxic Analysis in NEPA Documents*). The following language is taken verbatim from this guidance document.

In addition to the criteria air pollutants for which there are the NAAQS, U.S. EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

The Clean Air Act identified 188 air toxics, also known as hazardous air pollutants. The U.S. EPA has assessed this expansive list of toxics and identified a group of 21 as mobile source air toxics, which are set forth in their March 2001 final rule, *Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235).* The U.S. EPA also extracted a subset of this list of 21 that FHWA refers to as the six priority MSATs. These are benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The U.S. EPA is the lead Federal Agency for administering the Clean Air Act (CAA) and has certain responsibilities regarding the health effects of MSATs. Their March 2001 rule was issued under the authority of Section 202 of the Clean Air Act. In the rule, U.S. EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in vehicle miles traveled (VMT), these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel particulate PM emissions by 87 percent, as shown in the following graph, Figure C1:



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: *Highway Statistics 2000*, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM + DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.

Figure C1 MSAT Trends

Early in 2007 and under authority of CAA Section 202(l), U.S. EPA issued a new rule, Control of Hazardous Air Pollutants from Mobile Sources, to regulate MSATs. Under this rule, U.S. EPA set standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers. Beginning in 2011, refineries will be required to limit the annual benzene content of gasoline to an annual average refinery average of 0.62 percent. The rule also sets a new vehicle exhaust emission standard for non-methane hydrocarbon (NMHC) including MSAT compounds, to be phased in between 2010 and 2013 for lighter vehicles and 2012 and 2015 for heavier vehicles. These new rules became effective on April 27, 2007. The new standards are estimated to reduce total emissions of MSATs by 330,000 tons in 2030, including 61,000 tons of benzene. Concurrently, total emissions of volatile organic compounds (VOC) will be reduced by over 1.1 million tons in 2030 as a result of adopting these standards.

MSAT Analysis Guidance

FHWA's Interim Guidance on Air Toxics Analysis in NEPA Documents (February 2006) presents a tiered approach for analyzing MSATs. Depending on project specifics, FHWA has identified three levels of analysis:

- Tier I: No analysis for projects with no potential for meaningful MSAT effects;
- Tier II: Qualitative analysis for projects with low potential MSAT effects; or

- Tier III: Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

The proposed Zoo Interchange improvements, with design year average annual daily traffic (AADT) in excess of 150,000 vehicles per day, meet FHWA's criteria for a Tier III analysis. As such a quantitative analysis of potential MSAT emissions for the six priority MSATs for each alternative is required.

Tier III Quantitative MSAT Analysis

A quantitative analysis was completed to provide a basis for identifying and comparing the potential differences among MSAT emissions—if any—from the various alternatives. The quantitative assessment presented below is derived in part from a study conducted by the FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, found at:

www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm

Scope and Methodology

The quantitative MSAT analysis estimates the annual emissions of the six priority MSATs as a function of VMT and MSAT emission rates developed by MOBILE6.2. The simplest scope of analysis would be to only calculate emissions for those roadway segments that would be constructed as part of the project. However, this methodology would not consider the influence of the proposed project on the surrounding areas. Therefore, it is more appropriate to define an Affected Transportation Network to better capture the MSAT emissions that would be generated as a result of the project. This network would include the proposed project plus other transportation links where traffic volumes are expected to change as a result of the project.

The Affected Transportation Network (MSAT Study Area) was based on the project-level traffic forecast area developed by SEWRPC. According to FHWA, the typical accuracy threshold of travel demand forecasting is plus or minus five percent AADT. Also, changes of plus or minus five percent AADT can affect changes of plus or minus ten percent or more in emissions on congested roadways. Since the project level traffic forecast network was established for the Zoo Interchange study area, this is the network that was used in the MSAT analysis. The network, in addition to I-94, I-894 and USH 45, also included major arterials that intersected or crossed the study-area freeway system, along with parallel roads as far west as 124th Street, as far east as 68th Street, and from Oklahoma Avenue on the south to Capitol Drive on the north.

The MSAT analysis years included the base year (2004), first full opening year (2016) and design year (2035) for the No-Build and both 6-lane and 8-lane Build Alternatives. The MSAT emissions analysis was completed using the current version of U.S. EPA's regulatory mobile source emission factor model, MOBILE6.2 dated November 2003 as implemented in FHWA's Easy Mobile Inventory Tool—or EMIT. Based on MOBILE6.2 emission factors, EMIT produced emissions for the six priority air toxic pollutants in tons per year using the following locale-specific input files:

- Vehicle Age Distributions

- VMT Fraction by Vehicle Classification
- VMT Fraction by Hour of Day
- Inspection/Maintenance Program
- Anti-Tampering Program
- Seasonal Fuel Specifications, Temperatures, and Humidity
- Emissions Due to Vehicle Engine Starts
- Highway Network Travel Data

The MOBILE6.2 parameters were provided by the DNR (DNR, 2009). The Highway Network Travel Data was developed from SEWRPC's network for the Affected Transportation Network, and included the following information for each link: length, AADT, number of lanes, Highway Performance Monitoring System (HPMS) Area Type, HPMS Functional Classification, free flow speed and capacity.

MSAT Analysis Results

The amount of MSATs emitted in the region would be proportional to VMT. However, because of improvements in emissions technologies, total MSAT emissions will decline over time, even while VMT increases.

Within the Affected Transportation Network, VMT is expected to increase by 24 percent between 2004 and 2035. The estimated VMT in 2035 with the 6-lane or 8-lane Build Alternatives are 7.5 to 8.9 percent greater than the No-Build Alternative (Figure C2). This additional VMT contributes to the Build Alternative having slightly higher MSAT emissions compared to the No-Build Alternative.

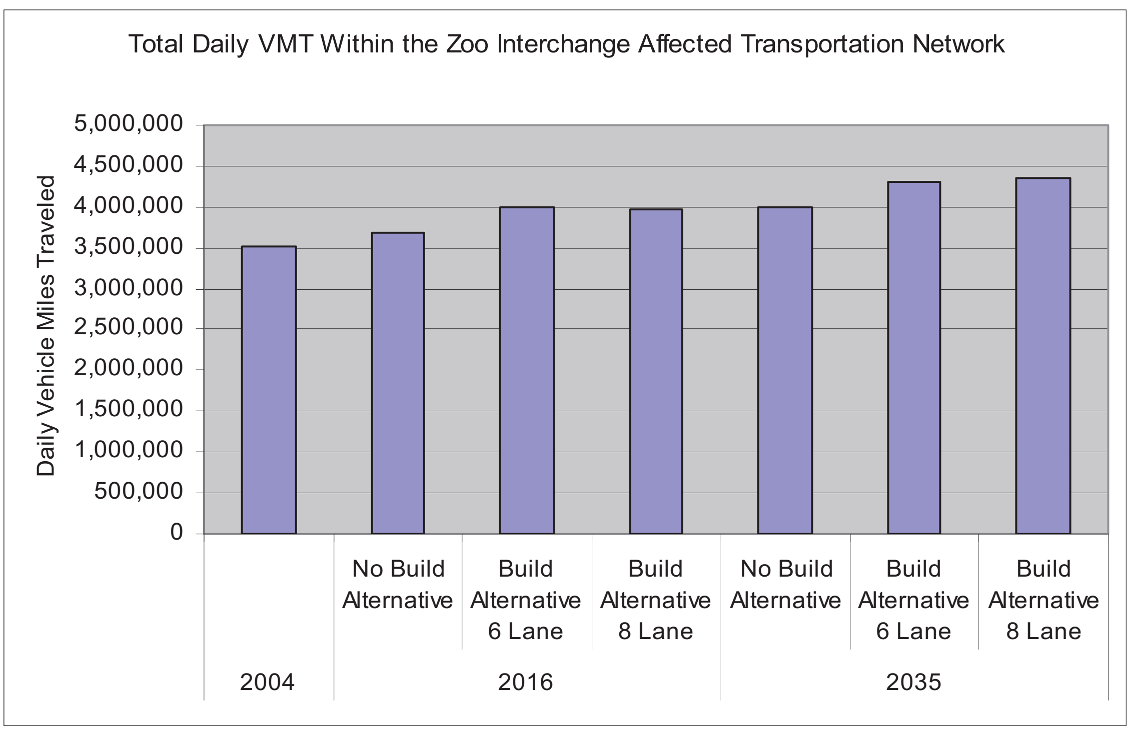


Figure C2 Daily VMT

Regardless of the alternative chosen, MSAT emissions will be lower than present levels in the design year as a result of U.S. EPA's national control programs. On a national basis, these programs are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the U.S. EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions are lower in the future. As shown in Figure C3, MSAT emissions in the Affected Transportation Network are predicted to decrease by 66 percent between 2004 and 2035 despite a 24 percent increase in VMT. Figure C3 also indicates that the differences in MSAT emissions between the No-Build Alternative and the 6-lane or 8-lane Build Alternatives are relatively small, varying by just 1.6 tons per year in 2016 and only 1,040 pounds (0.52 ton) per year in 2035. The slightly greater MSAT emissions in 2035 associated with the Build Alternatives compared to the No-Build Alternative are the result of a 7.5 to 8.9 percent increase in VMT.

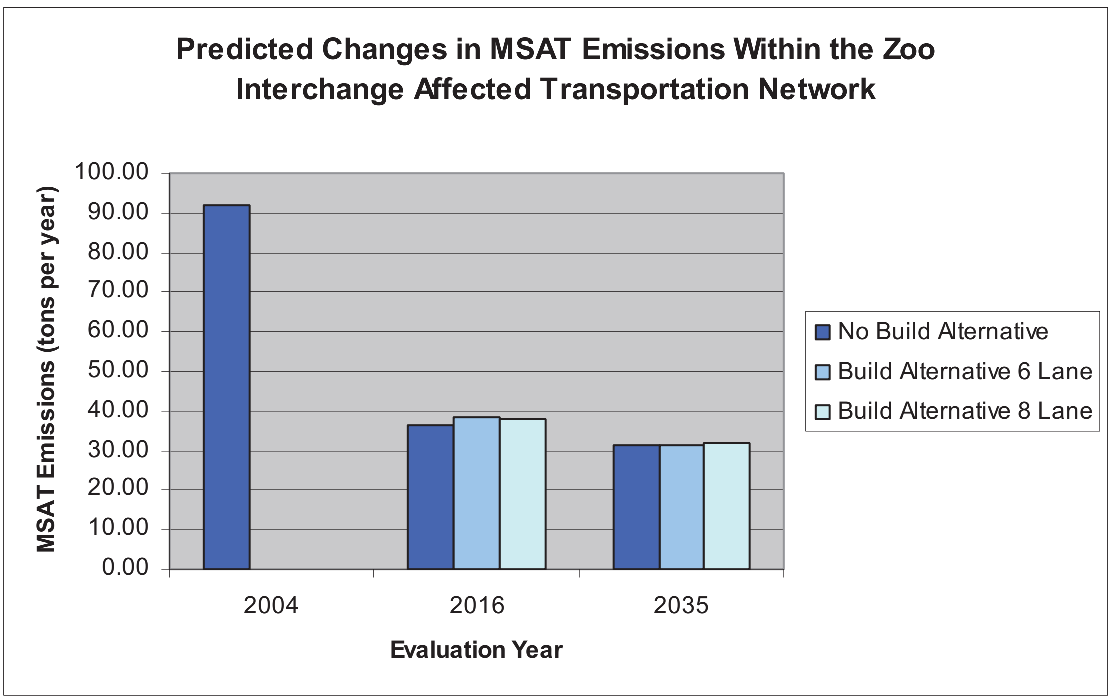


Figure C3 Predicted MSAT Emission Changes

As shown in Table C-1, the greatest reduction in MSAT emissions is expected for Diesel Particulate Matter (DPM). Smaller reductions are anticipated for the remaining pollutants. Variations between the No-Build Alternative and Build Alternative are minor.

TABLE C-1
MSAT Analysis

	Tons per Year							Percent Change	
		2016			2035				
MSAT Pollutant	2004	No-Build Alternative	Build Alternative 6 Lanes	Build Alternative 8 Lanes	No-Build Alternative	Build Alternative 6 Lanes	Build Alternative 8 Lanes	2004 to 2035 6 Lanes	2004 to 2035 8 Lanes
Benzene	32.37	15.88	16.62	16.41	14.67	14.97	15.05	-54%	-54%
DPM	27.57	4.68	5.10	5.18	1.24	1.34	1.40	-95%	-95%
1,3 Butadiene	4.44	2.17	2.26	2.23	2.04	2.06	2.07	-54%	-53%
Formaldehyde	15.65	7.90	8.04	7.94	7.54	7.39	7.45	-53%	-52%
Acetaldehyde	11.02	5.63	5.82	5.75	5.30	5.31	5.35	-52%	-51%
Acrolein	0.72	0.34	0.35	0.34	0.33	0.32	0.32	-56%	-56%
Totals	91.77	36.60	38.19	37.85	31.12	31.39	31.64	-66%	-66%

Note: Totals may not add correctly due to rounding.

The additional travel lanes contemplated as part of the 8-lane Alternative will have the effect of moving traffic closer to some homes, schools and businesses; therefore, there may be localized areas where ambient concentrations of MSATs could be higher compared to the 6-lane Alternative (with both Build Alternatives being considerably lower than existing concentrations). Since the Build VMT is slightly greater than the No-Build VMT, there may be localized areas where ambient concentrations of MSATs could be higher under either the 6-lane or 8-lane Build Alternative than the No–Build Alternative. Also, MSATs will be lower in other locations when traffic shifts away from them. However, as discussed below, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be reliably quantified due to the inherent deficiencies of current models.

In summary, MSAT emissions in 2035 are expected to be relatively similar under the Build Alternatives relative to the No-Build Alternative. In comparing the Build Alternatives to the No-Build Alternative, MSAT levels could be higher in some locations than others, but current tools and science are not adequate to reliably quantify them. However, on a regional basis, U.S. EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that will cause region-wide MSAT levels to be significantly lower than today. As this analysis shows, despite VMT increases from 2004 to 2035, MSAT emissions are still anticipated to decline considerably over the same period. The proposed project would not interfere with the substantial emissions reductions forecasted in the project area due to the implementation of U.S. EPA's regulations.

Unavailable Information for Project Specific MSAT Quantitative Impact Analysis

This Appendix includes a basic analysis of the likely MSAT emission impacts of the proposed Zoo Interchange improvement project. In FHWA's view, the lack of a national consensus on an acceptable level of risk and other air quality criteria assumed to protect the public health and welfare, as well as the reliability of available technical tools do not enable us to predict with confidence the project-specific health impacts of the emission changes associated with the alternatives evaluated in this Draft Environmental Impact Statement (DEIS) The outcome of such an assessment would be influenced more by the uncertainty introduced into the process by the assumptions made rather than any real insight into the actual health impacts from MSAT exposure directly attributable to the proposed action. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

Information that is Unavailable or Incomplete

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements; chief among them is what constitutes an "acceptable level" of risk. Incremental risk levels from a new source which are projected to be less than 1 in 1 million are generally considered to be negligible; while, incremental risk levels greater than 100 in 1 million are generally considered to be unacceptable. Indeed, the U.S. EPA prevailed in a recent U.S. Court of Appeals for the District of Columbia decision (Natural Resources Defense Council v. Environmental Protection Agency, No. 07-1053, June 8, 2008) that its 2006 hazardous organic National Emission Standards for Hazardous Air Pollutants (NESHAPs) rule reduced emissions to levels that present "an acceptable level of risk and protect public health with an ample margin of safety" at risks less than 100 in 1 million. U.S. EPA's benzene NESHAPs is also based on reducing risks to less than 100 in 1 million.

There is also no national consensus on dose-response values for MSATs. For instance, the U.S. EPA provides ranges of air concentrations at specific risk levels for lifetime exposure to benzene, with uncertainty spanning perhaps an order of magnitude. The practical uncertainty is even greater, because the California Air Resources Board (CARB) puts the air concentration risk levels for benzene at an order of magnitude less than equivalent U.S. EPA values. In addition, most notably, CARB has implemented an air concentration risk level for diesel PM; whereas, the U.S. EPA has not. U.S. EPA states in their risk assessment of diesel PM entitled "Health Assessment Document for Diesel Exhaust" (Office of Research and Development, EPA/600/8-90/057F, May 2002, pp 8-15, http://www.epa.gov/risk/basicinformation.htm#g) that:

> "an exploratory risk analysis shows that environmental cancer risks possibly range from 10^{-5} to nearly 10^{-3}, while a consideration of numerous uncertainties and assumptions also indicates that lower risk is possible and zero risk cannot be ruled out. These risk findings are only general indicators of the potential significance of the lung cancer hazard and should not be viewed as a definitive quantitative characterization of risk or be used to estimate an exposure-specific population impact."

In contrast to U.S. EPA's risk assessment for diesel PM, there is little-to-no documentation as to precisely how the CARB unit risk value for diesel PM was obtained, nor precisely on what it is based. The uncertainties in the unit risk value for diesel PM are exceptionally large, since epidemiological studies of diesel engine exhaust do not consistently find that exposure to diesel PM causes cancer (cohorts of underground miners exposed to the highest concentrations of diesel PM, for example, appear to have no excess risk of lung cancer). Thus, the U.S. EPA has found that the available epidemiological data do not support the development of any unit risk value for diesel PM.

An association between an incremental increase in traffic volumes and the risk level generally considered unacceptable is implied in a screening-level risk analysis included in the National Cooperative Highway Research Program (NCHRP) report entitled "Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process" (NCHRP 25-25 Task 18, March 2007). For freeways, an incremental increase in traffic volumes of 125,000 to 443,000 AADT is linked with an incremental 1 in 1 million risk level, based on U.S. EPA's range of unit risk values for benzene. The analysis was conducted for an overly simplified exposure condition, assuming that emission levels associated with a 2010 vehicle fleet would persist for 70 years, discounting the recognized significant mitigation associated with U.S. EPA's Tier 2 and heavy-duty truck emissions standards and the 2007 MSAT rule. By extension, based on the same over-simplification, an incremental increase in freeway traffic volumes of 1,250,000 to 4,430,000 AADT are associated with a 10 in 1 million risk level and an incremental increase in freeway traffic volumes of 12,500,000 to 44,300,000 AADT are associated with a 100 in 1 million risk level – the level above which is generally considered unacceptable. The inherent assumption is that U.S. EPA is correctly estimating benzene and diesel PM air concentration risk levels and CARB's estimates are incorrect. Different results and conclusions would be obtained if the reverse is true or if neither U.S. EPA nor CARB is correct. Consequently, FHWA finds that there is considerable uncertainty associated with estimates of adverse residual risk after implementation of U.S. EPA's 2007 MSAT rule and other control programs.

According to U.S. EPA in their Air Toxics Risk Assessment Reference Library, risk and hazard estimates are typically reported as one significant figure. Based on the NCHRP screening-level risk analysis model, the ability to discern between a 1 in million risk level and a 2 in 1 million risk level is associated with a freeway traffic volume increase of 125,000 to 443,000 AADT. In FHWA's view, risk assessment methodologies applied to highway projects are a blunt instrument.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are also encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

1. Emissions: U.S. EPA characterizes their MOBILE6.2 emission factor model as a regional model and not a project-level model. It is a trip-based model, where emission factors are projected based on a "typical" trip of 7.5 miles and vehicle speeds averaged over the trip. MOBILE6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this, it has limited applicability at the project level. U.S. EPA will be addressing this limitation in its MOVES model, a replacement to MOBILE6.2. The implication of this limitation is illustrated and noted by UC-Davis in Figure C4, i.e., "Smooth flow reduces emissions by a factor of nearly 20," which cannot be reflected in a trip-based or link-based model. Similar results have been found in analyses by UC Riverside (Barth, for CO2) and NC State (Frey, for multiple pollutants).

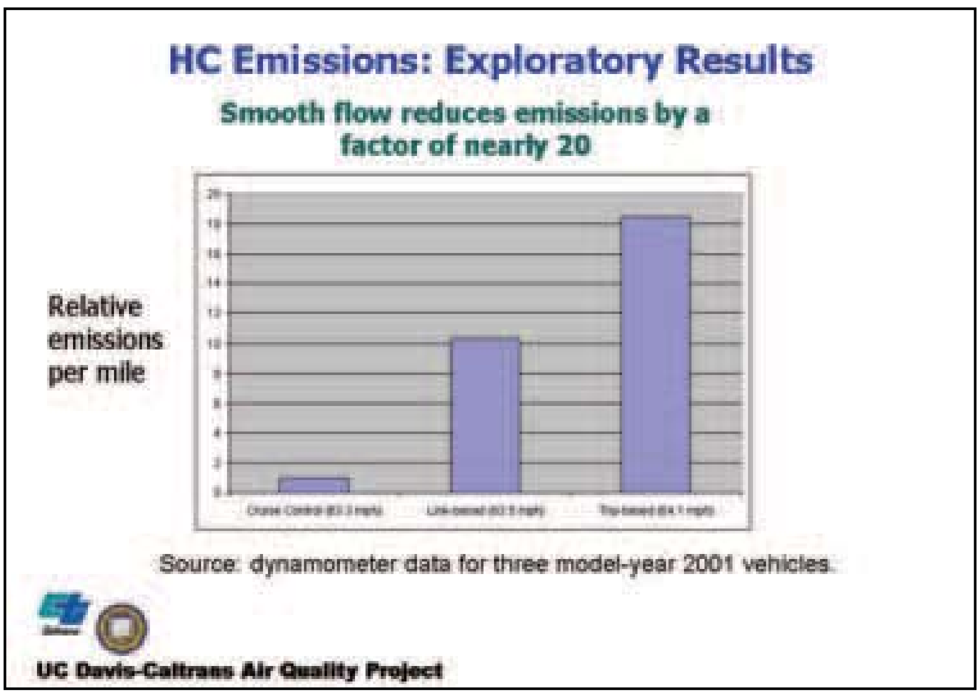


Figure C-4
UC-Davis Comparison of Emissions (Trip-based versus Link-based versus Cruise)

Even within the confines of regional emissions modeling, U.S. EPA and CARB have a different view of what MSAT emissions would look like from a future vehicle fleet required to meet identical vehicle emission standards. Although the same basic concepts were used in developing their respective mobile source emission factor models, widely disparate results are produced for MSATs. U.S. EPA's MOBILE6.2 model generally predicts higher emission factors for benzene compared to CARB's Emfac2007 model. Emfac2007 generally predicts higher emission factors for diesel PM compared to MOBILE6.2. Figure C5 provides a comparison of emission factors produced by the models for benzene and diesel particulate matter for the 2030 calendar year. Notice that diesel PM emission factors from MOBILE6.2 do not vary with speed; in Emfac2007 they do. In part, because of this, U.S. EPA has concluded that (71 FR 12498):

> "we continue to believe that appropriate tools and guidance are necessary to ensure credible and meaningful PM2.5 and PM10 hot-spot analyses. Before such analyses can be performed, technical limitations in applying existing motor vehicle emission factor models must be addressed, and proper federal guidance for using dispersion models for PM hotspot analysis must be issued. With the release of MOBILE6.2, state and local transportation agencies now have an approved model for estimating regional PM2.5 and PM10 emission factors in SIP [State Implementation Plan] inventories and regional emissions analyses for transportation conformity. However, MOBILE6.2 has significant limitations that make it unsatisfactory for use in microscale analysis of PM2.5 and PM10 emissions as necessary for quantitative hot-spot analysis."

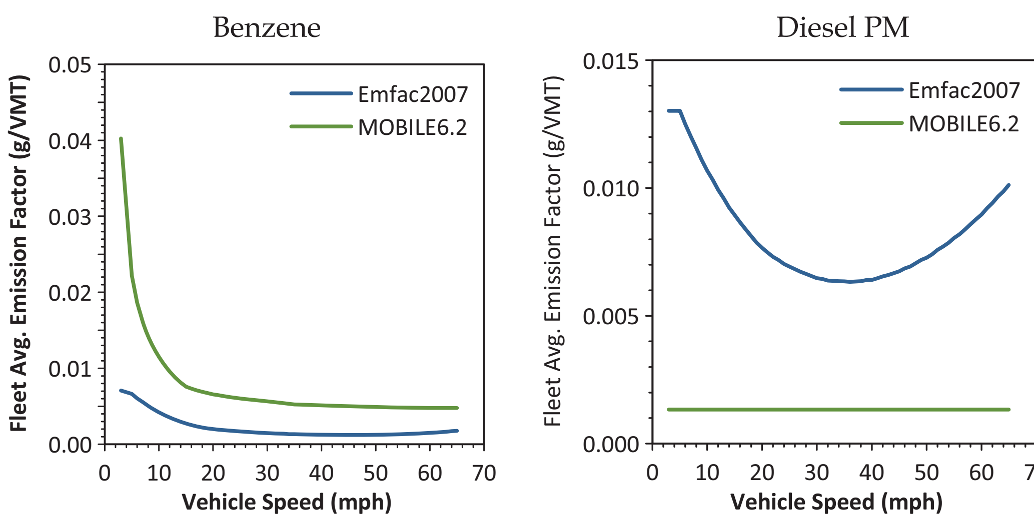


Figure C5
MOBILE6.2/Emfac2007 Comparison of Emissions (Calendar Year 2030)

The limitations noted by U.S. EPA equally apply to diesel PM emission factors.

2. Dispersion: The tools to predict how MSATs disperse are also limited. The U.S. EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated with emission rates from the MOBILE4 model more than a decade ago. Based on updated emission rates to MOBILE5, an extensive evaluation of the CAL3QHC model was conducted in an NCHRP study as part of the development of the HYROAD model. The

study report documents poor model performance at ten sites across the country, 3 where intensive CO monitoring was conducted plus an additional 7 with less intensive monitoring. The report is available online from U.S. EPA at www.epa.gov/scram001/dispersion_alt.htm#hyroad.

3. Exposure Levels and Health Effects: Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to reliably forecast long-term concentrations of MSATs near roadways, and to determine the portion of time that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for lifetime, 70-year risk assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by the Health Effects Institute (HEI).

   For example, consider the exposure-response relationship for alcoholic beverages. Alcoholic beverages are established causes of cancer in humans; about 3% of all cancers world-wide are thought to be caused by over-consumption of alcoholic beverages. There is a clear dose-response relationship for alcoholic beverages, with risk of cancer death increasing (essentially) linearly for exposures ranging from 2 drinks per day through 6-plus drinks per day. But there is neither evidence nor reason to suppose that, for example, 1 or 0.5 drinks per day also increase people's risk of cancer death. Indeed, the exposure-response data, interestingly enough, show a "J-shaped" dose response relationship, such that people consuming 1 drink per day are significantly *less* likely to die of cancer than those who drink no alcoholic beverages. If one were to make the standard "regulatory style" assumption about low-level exposure to alcohol, one would both vastly overestimate the cancer risk, and also miss entirely what turns out to be a low-level protective effect. In such a case, it would hardly be "erring on the side of public health" to estimate that exposures that are orders of magnitude smaller than the 2 drinks-per-day cancer-effect-level put people at risk of cancer. This is not to say, of course, that very-low-level exposures to MSAT emissions prevent cancer; nor is it to assert that such exposures are demonstrably or obviously safe. It is only to point out that extrapolation beyond observable exposures and responses are at best an uncertain business and become increasingly uncertain the farther one strays from the empirical data.

Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of U.S. EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or state level.

The U.S. EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The U.S. EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from U.S. EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust (DE)** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes – particularly respiratory problems.[1] Many health studies use an epidemiological

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[1] South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-III (2007); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.

approach to relate the possibility of harm due to the proximity to the roadway. FHWA has concerns about reaching conclusions regarding health impacts from highway emissions based on proximity studies in areas known to exceed ambient air quality standards, such as the recent study by Dr. James Gauderman, et al., entitled “Effect of Exposure to Traffic on Lung development from 10 to 18 Years of Age: A Cohort Study.” These studies do not measure specific pollutants but only roadway proximity, so any reported negative health impacts may be due to either the criteria pollutants or MSATs. Epidemiological studies suffer from the limitation that they cannot by their very nature establish causality. They may indicate statistical associations, but other confounding factors may be missed and may represent the true cause of the impact. Furthermore, not all studies show a negative impact. For example, the “Long term Effects of Traffic-Related Air Pollution on Mortality,” Beelen et al., only found weak associations between proximity to major roadways and health effects. This fact was also reported as a major shortcoming in health studies of this nature in, “Does Traffic-Related Air Pollution Contribute to Respiratory Disease Formation in Children,” M. Jerritt, ERJ 2007, Vol. 29. In his review, Jerritt also points out another shortcoming in recent health studies dealing with determining the effect of proximity. He points out that most of these studies utilize a basic measure of distance to roadway as a proxy of exposure; however, because of the variable nature of particles and gaseous pollutants, the true variability of air pollutants within the neighborhood scale needs to be captured to identify the health effects of specific components of the air pollution mixture. Additionally, he states “exposures assigned on distance to traffic or traffic counts near the home are prone to . . . errors . . . and biased results.”

Because analytical methodologies vary greatly between individual health studies, and all studies have limitations, it is not practical to draw definitive conclusions based solely on individual studies. Rather the total body of literature needs to be consulted before conclusions can be made. To that end, the Health Effects Institute, a non-profit organization funded by U.S. EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The first study was completed and the findings published last year in Special Report 16 – Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects, available online at www.healtheffect.org. For each of the MSATs reviewed, the analysis answers three questions:

1. To what extent are motor vehicles a significant source of exposure?
2. Does it affect human health?
3. Does it affect human health at environmental concentrations?

HEI concludes that exposure to many MSATs comes from sources other than vehicles and that mobile sources are the primary sources of exposure for only a few of the 21 MSATs listed by the U.S. EPA in its 2001 Rule. For many of the MSATs reviewed, HEI concluded that there is insufficient data for an assessment of ambient exposures on human health.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based Upon Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community

Given the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be reliably made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

In this Appendix, the FHWA and WisDOT have provided a quantitative analysis of MSAT emissions relative to the No-Build and two Build alternatives. The FHWA and WisDOT have acknowledged that the project may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be reliably estimated.